Claims

1. A mechanism for powering a combine header comprising:

a primary motor having a rotatable primary output shaft, the primary motor being adapted to rotate the primary output shaft at forward rotational speeds;

a rotatable primary input shaft;

a clutch extending between the primary output shaft and the primary input shaft, the clutch being adapted to controllably couple the primary output shaft to the primary input shaft;

a variable speed secondary motor having a rotatable secondary output shaft, the secondary motor being adapted to controllably rotate the secondary output shaft at variable forward and reverse rotational speeds;

a rotatable secondary input shaft coupled to the secondary output shaft;

a rotatable header output shaft adapted to transmit power to the combine header;

a planetary gear-train comprising a sun gear, a ring gear, and a planet gear assembly, the planet gear assembly having planet gears meshing with the sun gear and with the ring gear, the sun gear being coupled exclusively to one of the primary input shaft, the secondary input shaft, and the header output shaft, the ring gear being coupled exclusively to one of the remaining of the primary input shaft, the secondary input shaft, and the header output shaft, and the planet gear assembly being coupled exclusively to the other of the remaining of the primary input shaft, the secondary input shaft, and the header output shaft.

a control circuit adapted for receiving command from an operator, the control circuit being in communication with the clutch and the secondary motor, the control circuit being adapted to command the clutch to couple the primary output shaft to the primary input shaft in response to operator command, and to command the secondary motor maintain variable forward and reverse rotational speeds of the secondary output shaft in response to operator command.

2. The mechanism described in Claim 1, wherein the control circuit commands the clutch to couple the primary output shaft to the primary input shaft, and commands the secondary motor to maintain a fixed rotational speed of the

secondary output shaft at zero, in response to an operator command for normal fixed-speed operation of the combine header.

3. The mechanism described in Claim 2, wherein the control circuit further commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable high-speed operation of the combine header.

4. The mechanism described in Claim 1 further comprising a secondary brake coupled to the secondary input shaft, the secondary brake being adapted to fix the secondary input shaft rotation at zero, and to controllably release the secondary input shaft for rotation, the control circuit being in communication with the secondary brake, and being adapted to command the secondary brake to release the secondary input shaft for rotation in response to operator command.

5. The mechanism described in Claim 4, wherein the control circuit commands the clutch to couple the primary output shaft to the primary input shaft in response to an operator command for normal fixed-speed operation of the combine header.

6. The mechanism described in Claim 5, wherein the control circuit further commands the secondary brake to release the secondary input shaft for rotation, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable high-speed operation of the combine header.

7. The mechanism described in Claim 1 further comprising a primary brake coupled to the primary input shaft, the primary brake being adapted to controllably halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, the control circuit being in communication with the primary brake, and being adapted to command the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, in response to operator command.

8. The mechanism described in Claim 7, wherein the control circuit commands the clutch to couple the primary output shaft to the primary input shaft, and commands the secondary motor to maintain a fixed rotational speed of the secondary output shaft at zero, in response to an operator command for normal fixed-speed operation of the combine header.

9. The mechanism described in Claim 8, wherein the control circuit further commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable high-speed operation of the combine header.

10. The mechanism described in Claim 7, wherein the control circuit commands the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable low-speed operation of the combine header.

11. The mechanism described in Claim 7 further comprising a secondary brake coupled to the secondary input shaft, the secondary brake being adapted to fix the secondary input shaft rotation at zero, and to controllably release the secondary input shaft for rotation, the control circuit being in communication with the secondary brake, and being adapted to command the secondary brake to release the secondary input shaft for rotation in response to operator command.

12. The mechanism described in Claim 11, wherein the control circuit commands the clutch to couple the primary output shaft to the primary input shaft in response to an operator command for normal fixed-speed operation of the combine header.

13. The mechanism described in Claim 12, wherein the control circuit further commands the secondary brake to release the secondary input shaft for rotation, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable high-speed operation of the combine header.

14. The mechanism described in Claim 11, wherein the control circuit commands the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, commands the secondary brake to release the secondary input shaft for rotation, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable low-speed operation of the combine header.

15. The mechanism described in Claim 11, wherein the control circuit commands the primary brake to halt rotation of the primary input shaft, and to fix the primary

input shaft rotation at zero, in response to an operator command for a rapid shut-down of the combine header.

16. A mechanism for powering a combine header comprising:

a primary motor having a rotatable primary output shaft, the primary motor being adapted to rotate the primary output shaft at forward rotational speeds;

a rotatable primary input shaft;

a clutch extending between the primary output shaft and the primary input shaft, the clutch being adapted to controllably couple the primary output shaft to the primary input shaft;

a variable speed secondary motor having a rotatable secondary output shaft, the secondary motor being adapted to controllably rotate the secondary output shaft at variable forward and reverse rotational speeds;

a rotatable secondary input shaft coupled to the secondary output shaft;

a rotatable header output shaft adapted to transmit power to the combine header;

a planetary gear-train comprising a sun gear, a ring gear, and a planet gear assembly, the planet gear assembly having planet gears meshing with the sun gear and with the ring gear, the sun gear being coupled exclusively to one of the primary input shaft, the secondary input shaft, and the header output shaft, the ring gear being coupled exclusively to one of the remaining of the primary input shaft, the secondary input shaft, and the header output shaft, and the planet gear assembly being coupled exclusively to the other of the remaining of the primary input shaft, the secondary input shaft, and the header output shaft.

a primary brake coupled to the primary input shaft;

a secondary brake coupled to the secondary input shaft;

a control circuit adapted for receiving command from an operator, the control circuit being in communication with the clutch, the secondary motor, the primary brake, and the secondary brake, the control circuit being adapted to command the clutch to couple the primary output shaft to the primary input shaft in response to operator command, to command the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft in response to operator

command, to command the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, in response to operator command, and to command the secondary brake to release the secondary input shaft for rotation in response to operator command.

17. The mechanism described in Claim 16, wherein the control circuit commands the clutch to couple the primary output shaft to the primary input shaft in response to an operator command for normal fixed-speed operation of the combine header.

18. The mechanism described in Claim 17, wherein the control circuit further commands the secondary brake to release the secondary input shaft for rotation, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable high-speed operation of the combine header.

19. The mechanism described in Claim 16, wherein the control circuit commands the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, commands the secondary brake to release the secondary input shaft for rotation, and commands the secondary motor to maintain variable forward and reverse rotational speeds of the secondary output shaft, in response to operator command for variable low-speed operation of the combine header.

20. The mechanism described in Claim 16, wherein the control circuit commands the primary brake to halt rotation of the primary input shaft, and to fix the primary input shaft rotation at zero, in response to an operator command for a rapid shut-down of the combine header.

21. The mechanism described in Claim 16, wherein the primary motor comprises an engine and a transmission.

22. The mechanism described in Claim 16, wherein the secondary motor comprises a variable speed hydrostatic motor.

23. The mechanism described in Claim 16, wherein the control circuit comprises an electronic controller.

24. The mechanism described in Claim 16 further comprising a continuous belt being adapted to couple the clutch to the primary input shaft.